

REMARKS

Applicants have studied the Office Action dated February 3, 2005 and have made amendments to the claims. It is submitted that the application, as amended, is in condition for allowance. Claims 1-23 are pending. Claims 1-23 have been amended. Reconsideration and allowance of the claims in view of the above amendments and the following remarks are respectfully requested.

Claims 1-3, 11, 12, 18, and 19 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Yoshida et al. (U.S. Patent No. 6,401,121) in view of Zwilling et al. (U.S. Patent No. 6,249,792). Claims 4-10, 13-17, and 21-23 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Yoshida et al. in view of Zwilling et al. and Huber (U.S. Patent No. 6,584,551). These rejections are respectfully traversed.

The present invention is directed to automatic file system maintenance systems and methods that reduce the amount of user interaction that is necessary to maintain the file system. One preferred embodiment provides a method for automatically maintaining a file system. According to the method, there is received a maintenance schedule that specifies that a file system maintenance process is to be performed periodically or continuously, and a usage goal that defines the amount of free disk space on a target that is to be attained when the file system maintenance process is performed.

The file system maintenance process is automatically performed periodically or continuously according to the maintenance schedule to attain the amount of free disk space on the target that is defined by the usage goal. In the file system maintenance process, files are selected from the target for deletion so as to achieve the usage goal, and the files that were selected are deleted. The target comprises at least a portion of a file system. Because the file system maintenance process is automatically performed periodically or continuously according to the maintenance schedule, the amount of free disk space defined by the usage goal is repeatedly achieved with little or no interaction from the user.

The Yoshida reference is directed to a load distribution system that includes multiple file servers and a control server. The Zwilling reference is directed to a process for dynamically shrinking the size of a single data file. However, neither Yoshida nor Zwilling, or a combination of the two, discloses a method for automatically maintaining a file system in a maintenance schedule is received that specifies that a file system maintenance process is to be performed periodically or continuously, a usage goal is received that defines the amount of free disk space on a target that is to be attained when the file system maintenance process is performed, and the file system maintenance process is automatically performed periodically or continuously according to the maintenance schedule to attain the amount of free disk space on the target that is defined by the usage goal, as is recited in amended claim 1. Amended claim 11 contains similar recitations.

Similarly, neither Yoshida nor Zwilling, or a combination of the two, discloses a system for automatically maintaining a file system that includes a maintenance option definition interface for receiving a maintenance schedule that specifies that file system maintenance is to be performed periodically or continuously and a usage goal that defines the amount of free disk space on a target that is to be attained when the file system maintenance is performed, and a file system maintenance module for automatically performing the file system maintenance periodically or continuously according to the maintenance schedule to attain the amount of free disk space on the target that is defined by the usage goal, as is recited in amended claim 18.

Yoshida discloses a load distribution system having a control server that distributes transmission requests to the file servers so as to distribute the load among the servers. As shown in Figure 5, when a request for a file is received from a client, the control server selects one of the file servers to transmit the file based on selection criteria that includes which file server containing the requested file has the smallest current transmission count. If no file server meets the selection criteria, the control server determines whether the requested file should be copied from one file server to another.

As shown in Figure 6, if it is determined that the requested file should be copied to another file server, the control server selects one of the file servers as the destination server that

the requested file is to be copied to based on selection criteria that includes which file server not containing the requested file has sufficient space for the requested file. If no file server has sufficient space, the control server repeatedly delete a file from one file server until there is sufficient space on that file server for the requested file. The control server selects for deletion the file on that file server that has not been accessed in the longest time. Thus, Yoshida discloses a system that selectively copies a requested file from one server to another server and, as part of this file copying process, automatically deletes one or more files on the destination server to make enough space to hold the requested file.

Zwilling discloses a method that uses an allocation fence to dynamically shrink the size of a single data file. As shown in Figure 2, the allocation fence is set within the file, and then all the data above the fence is moved into empty spaces below the fence to create a smaller file. A utility program can be used to schedule the file shrinking process to occur in accordance with a predetermined schedule. Thus, Zwilling discloses a method for shrinking the size of a single file that can be performed according to a schedule.

In contrast, in embodiments of the present invention, a file system maintenance process for attaining an amount of free disk space defined by a usage goal is automatically performed periodically or continuously according to a maintenance schedule. In particular, the usage goal defines the amount of free disk space on a target that is to be attained when the file system maintenance process is performed, and the maintenance schedule specifies that the file system maintenance process is to be performed periodically or continuously. Given the usage goal and the maintenance schedule, the file system maintenance process is automatically performed periodically or continuously according to the maintenance schedule to attain the amount of free disk space on the target that is defined by the usage goal. Thus, embodiments of the present invention allow the amount of free disk space defined by the usage goal to be automatically achieved accordingly to the maintenance schedule with little or no interaction from the user.

Neither Yoshida nor Zwilling, or a combination of the two, teaches or suggests a file system maintenance process for attaining an amount of free disk space defined by a usage goal is automatically performed periodically or continuously according to a maintenance schedule. In the system of Yoshida, the automatic file deletion process just deletes one or more files so as to make enough room to copy a file. There is no usage goal received to define the amount of free disk space that is to be attained by the file deletion, and thus the file deletion process in Yoshida cannot possibly attain the amount of free disk space that is specified by a received usage goal.

Additionally, in the system of Yoshida, the automatic file deletion process is performed as part of the procedure for copying a file if there is not enough space for the file. There is no maintenance schedule received to specify that the file deletion process is performed periodically or continuously, and thus the file deletion process in Yoshida cannot possibly be automatically performed periodically or continuously according to a received maintenance schedule.

Further, in the system of Zwilling, the file shrinking process just shrinks the size of a single file. There is no usage goal received to define the amount of free disk space on the target file system that is to be attained by the file deletion, and thus the file deletion process in Yoshida cannot possibly attain the amount of free disk space on the target file system that is specified by a received usage goal.

Additionally, Applicants respectfully submit that one of ordinary skill in the art would not have had any motivation for modifying the file deletion process performed in the system of Yoshida with the scheduled file shrinking process of Zwilling so as to produce the claimed method and system in which the file system maintenance process is automatically performed periodically or continuously according to a maintenance schedule to attain the amount of free disk space on a target that is defined by a usage goal. It is well-settled that a reference must provide some motivation or reason for one of ordinary skill in the art (working without the benefit of hindsight reconstruction using the applicant's specification) to make the necessary changes in the disclosed method. The mere fact that a reference may be modified in the direction of the claimed invention does not make the modification obvious unless the reference expressly or impliedly teaches or suggests the desirability of the modification. In re Gordon, 221 USPQ

1125, 1127 (Fed. Cir. 1984); Ex parte Clapp, 227 USPQ 972, 973 (Bd. App. 1985); Ex parte Chicago Rawhide Mfg. Co., 223 USPQ 351, 353 (Bd. App. 1984).

Some motivation for combining the different features of the Yoshida and Zwilling references in a specific manner must be shown in order to sustain a finding of obviousness. There is simply no suggestion in Yoshida or Zwilling of combining selected features of one reference with the system of the other reference in order to produce the claimed system for automatically maintaining a file system, nor is there any suggestion of the desirability of such a combination. It is respectfully submitted that the Examiner is engaging in hindsight reconstruction of the claimed invention.

Further, Applicants submit that the scheduling feature of the file shrinking method of Zwilling cannot simply be inserted into the very different load distribution system of Walker. In fact, the file deletion process performed in the system of Yoshida cannot be performed according to a schedule. In the system of Yoshida, the file deletion process is performed immediately as part of the file copying process. It must be performed immediately in order to make room for the file to be copied because otherwise the file copying process that it is part of would fail. Further, the file deletion process performed in the system of Yoshida only makes room for the file being copied. Thus, the process cannot be performed according to a schedule instead of when a file is being copied. Thus, the combination of Yoshida and Zwilling suggested by the Examiner is unworkable.

Applicants believe that the differences between Yoshida, Zwilling, and the present invention are clear in amended claims 1, 11, and 18, which set forth various embodiments of the present invention. Therefore, claims 1, 11, and 18 distinguish over the Yoshida and Zwilling references, and the rejection of these claims under 35 U.S.C. § 103(a) should be withdrawn.

As discussed above, amended claims 1, 11, and 18 distinguish over the Yoshida and Zwilling references. Furthermore, the claimed features of the present invention are not realized even if the teachings of the Huber reference are incorporated into Yoshida and Zwilling. Huber does not teach or suggest the claimed features of the present invention that are absent from


Yoshida and Zwilling. Thus, amended claims 1, 11, and 18 distinguish over the Yoshida, Zwilling, and Huber references, and thus, claims 2-10, claims 12-17, and claims 19-23 (which depend from claims 1, 11, and 18, respectively) also distinguish over the Yoshida, Zwilling, and Huber references. Therefore, it is respectfully submitted that the rejections of claims 1-23 under 35 U.S.C. § 103(a) should be withdrawn.

Applicants have examined the references cited by the Examiner as pertinent but not relied upon. It is believed that these references neither disclose nor make obvious the invention recited in the present claims. In view of the foregoing, it is respectfully submitted that the application and the claims are in condition for allowance. Reexamination and reconsideration of the application, as amended, are requested.

If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is invited to call the undersigned attorney at (561) 989-9811 should the Examiner believe a telephone interview would advance the prosecution of the application.

Respectfully submitted,

Date: June 3, 2005

By: 
Stephen Bongini
Registration No. 40,917
Attorney for Applicants

FLEIT, KAIN, GIBBONS,
GUTMAN, BONGINI & BIANCO P.L.
One Boca Commerce Center
551 Northwest 77th Street, Suite 111
Boca Raton, Florida 33487
Telephone: (561) 989-9811
Facsimile: (561) 989-9812